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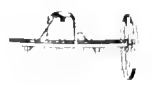
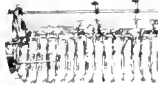
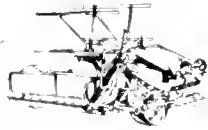
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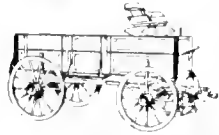
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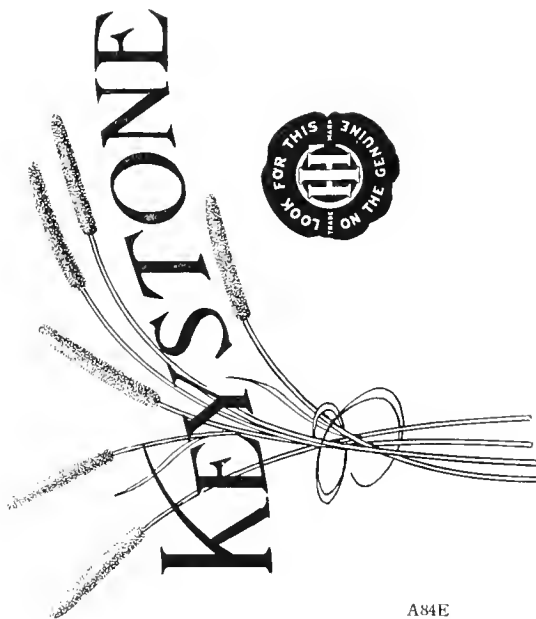


KEYSTONE

GEARLESS HAY LOADER

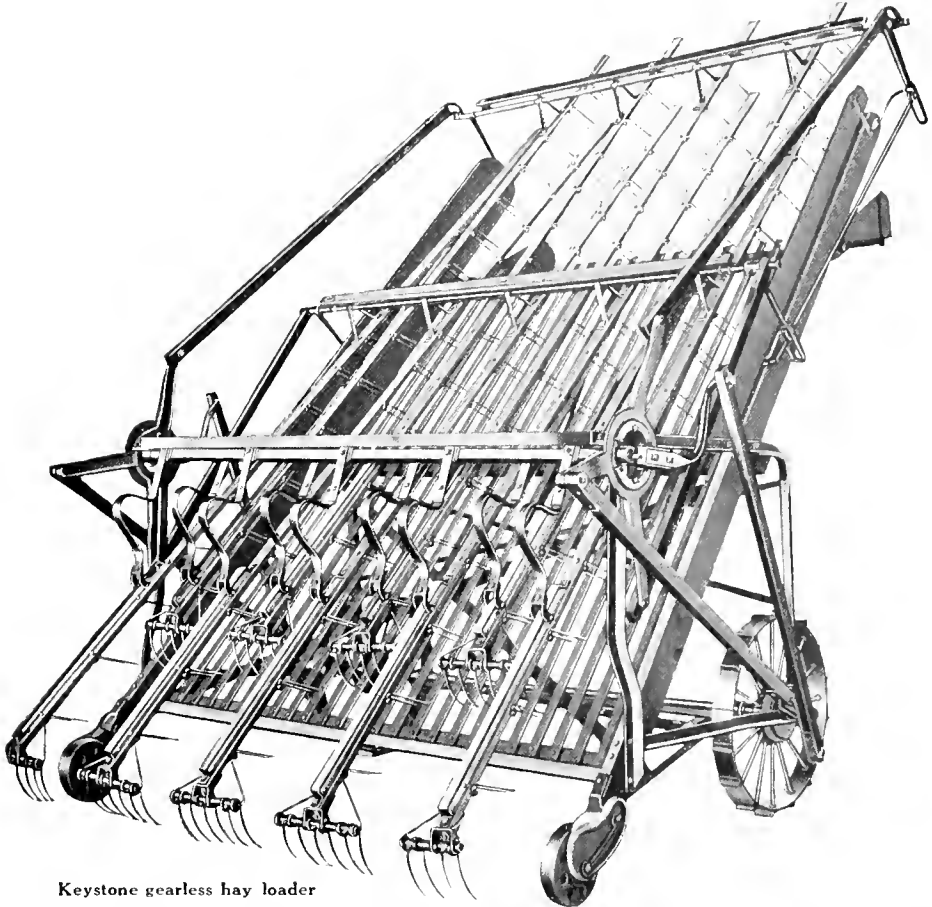


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Keystone Gearless Hay Loader

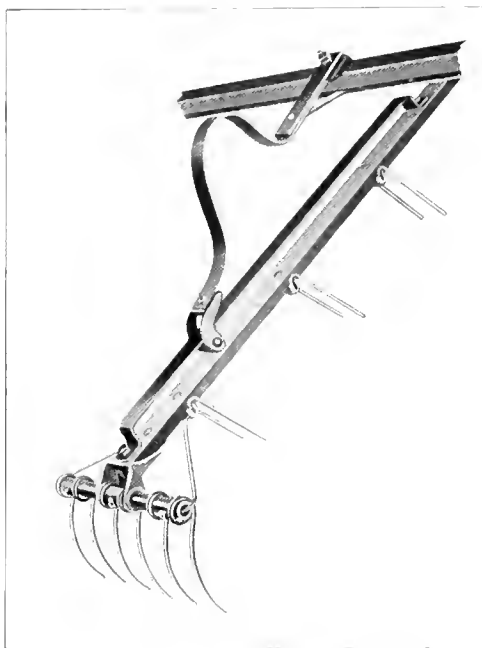


Keystone gearless hay loader

The Keystone gearless hay loader is of the rake type, and will load either from the swath or light windrow. One man can drive the team for a few minutes until a good quantity of hay has collected on the rear end of the wagon. He can then stop the team and distribute the hay evenly on the rack. By repeating this operation a good size load may be gathered in fifteen or twenty minutes. The entire absence of gears, sprockets, chains, etc., make this a remarkably simple and light draft loader. The absence of complicated working parts also increases its durability.

The Keystone has not the swinging motion common to other loaders, but runs steadily without twisting or straining. This valuable feature is secured by reducing the length of the axle and placing the wheels well under the loader. This construction also permits the driver to drive closer to fences and ditches than would be possible if the wheels were set at an ordinary distance from the loader. The wheels are strongly constructed of steel with wide, well lugged tires which secure sufficient draft to operate the loader under all conditions. The axle is of solid steel, strong enough to stand all strains.

Keystone Gearless Hay Loader



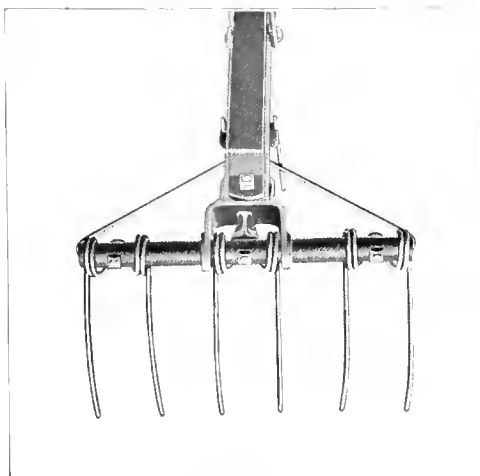
Note the roller and bracket connection between rake arm and rake bar, and the peculiar shape of rake arm. Also note manner in which teeth are fastened to the rake bar

The frame is strongly constructed. An angle steel rear cross brace makes the loader rigid and prevents swinging or swaying in rough places.

The drop gate has a wide range of adjustment and can be easily raised or lowered to suit the operator.

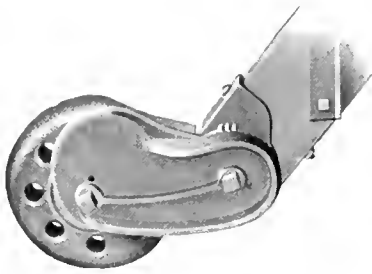
Oil tempered steel rake arms are used for connecting the rake bars to the rock shafts. The ends of these rake arms, which are attached to the rake bars by means of brackets, are provided with rollers to permit the bearings to move more easily and to eliminate friction. These rake arms are of a peculiar curved shape and permit the rake heads to spring up when passing over obstructions, in this way lessening the danger of breakage.

The rake heads have a great deal of flexibility and will bend forward and backward or tilt to either side. This allows them to pass over rough places or obstructions in the field without becoming bent or broken. The teeth are of the triple coil type, made of oil tempered steel, and are held in good, solid castings. The rake arms are of strong steel and have sufficient flexibility to prevent the rake heads from digging into the ground and raking trash with the hay. Another advantage is that the rake heads act independently of each other and when one is passing over an obstruction the work of the others is not interfered with.



Substantial flexible rake head

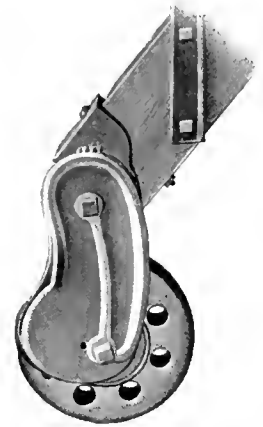
Keystone Gearless Hay Loader



Ground wheel adjusted to bring rakes
as near to the ground as possible

The ground wheels on the Keystone gearless loader can be adjusted to different heights without the use of any clumsy or inconvenient raising or lowering device. These wheels are equipped with roller bearings. The weight thrown upon them is just enough to keep the loader well balanced.

The driver who is using the Keystone never needs to get down off the load to disconnect it from the wagon. A simple, reliable hitching device is provided which is operated by a rope that extends from the release lock to the top of the load. Pulling this rope disconnects the loader from the wagon and leaves it standing in the field in an upright position ready for the next wagon. When hitching the loader to the wagon it is not necessary to back the center of the wagon exactly up to the hitching device. The release lock is mounted on a rod several feet long, and when unlatched this rod slides through a sleeve mounted on a small turntable. This permits the release lock to be pulled out and turned in any desired direction, then when the wagon is backed up the device latches automatically, holding the loader in the proper position.



Ground wheel adjusted for
raising rakes as far off the
ground as possible

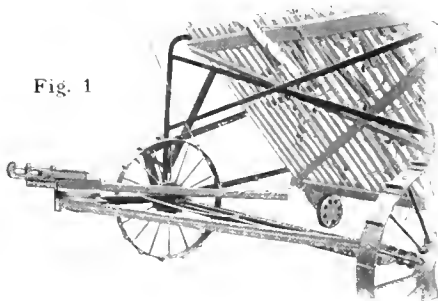


Fig. 1

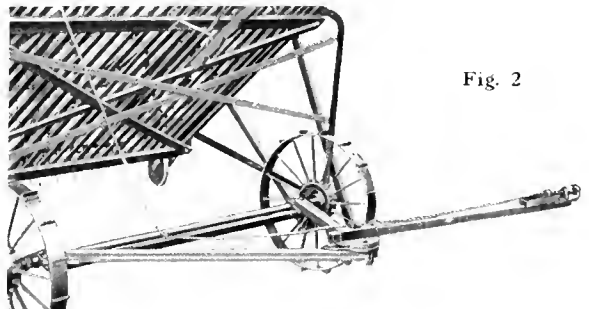
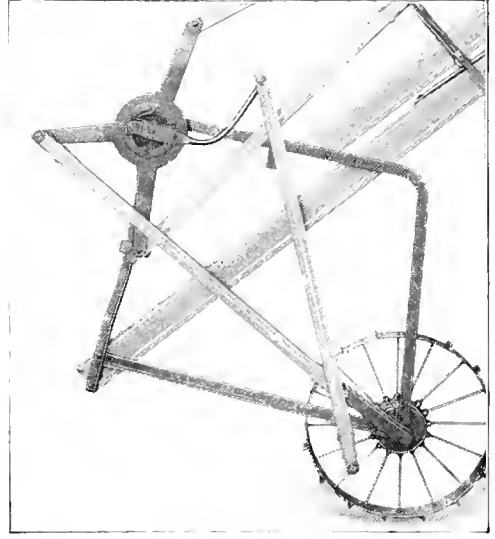
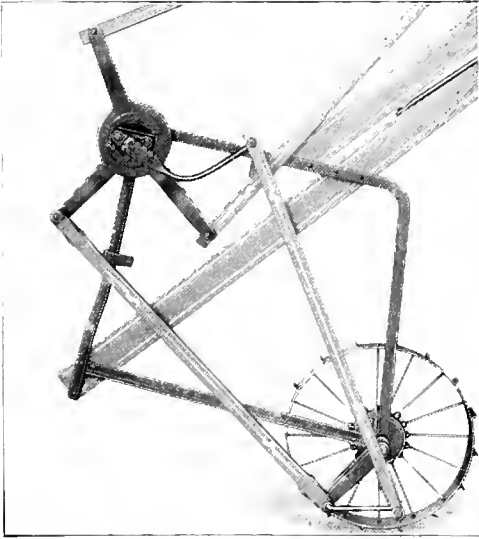


Fig. 2

The above cuts show the hitching device used on the Keystone gearless hay loader. In Fig. 1 the device is latched as it is when the loader is in operation. In Fig. 2 the rod has been pulled out its full length and swung around to the left in order to hitch to a wagon. The rod can be swung all the way around to the right or left.

Keystone Gearless Hay Loader



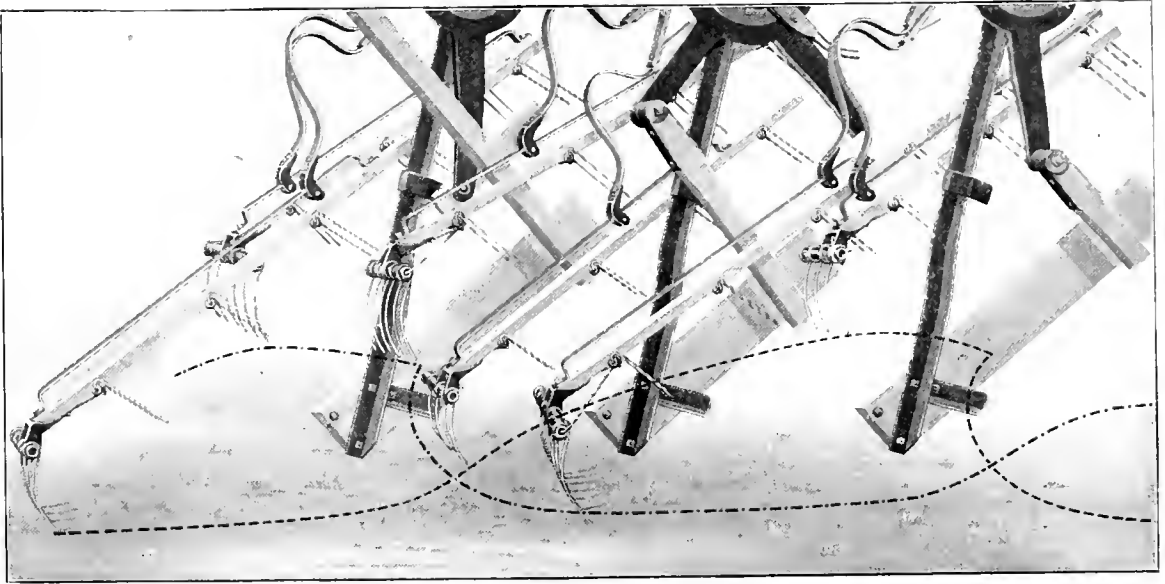
The illustrations above show the pitmans and fulcrum levers which operate the rake bars and rock shafts in two different positions

The Keystone gearless loader is equipped with two square rock shafts, which are a great improvement over the crooked crank shafts used on other loaders of this type. These rock shafts are timed to raise and lower the rake heads at the proper time and in the proper way to gather all the hay without digging into the ground. The strokes of the rake heads, because of the design of the rock shafts, are long and elliptical. The rake heads on the Keystone move parallel to the ground during nearly one-half the stroke. On other rake loaders the strokes are short and choppy, requiring a high-speed operating mechanism. The short, choppy strokes also dig up the ground and thresh the leaves and heads off the hay. When a crooked crank shaft is used it is very hard to keep the rake heads working in time but, with the rock shafts which are used on the Keystone gearless, this trouble is eliminated.

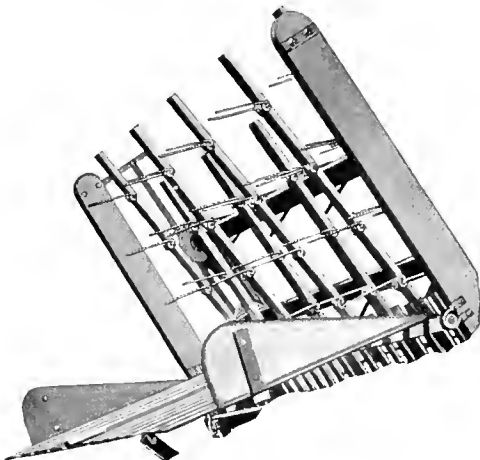
Another good feature of the Keystone is that on the return stroke the rakes are raised high from the ground so that they do not push the hay back or become wrapped.

On this loader the power is transmitted from the main wheel by means of cranks securely keyed to the axle outside of the wheel. These cranks are connected by means of pitmans to powerful fulcrum levers, which in turn drive the rake bars.

Keystone Gearless Hay Loader



This illustration shows how each set of the rakes moves along the ground during a large part of the stroke, and that the strokes are so timed that one set of rakes is moving along the ground practically at all times. This means that all the hay will be gathered and elevated onto the wagon. It also means that it is not necessary to operate the rake bars at a high speed and, therefore, the hay is handled in a very gentle way and moves slowly but surely up the elevator. The leaves and blossoms, which are the most valuable part of the hay, are not threshed off. If the strokes of the rakes were short and choppy, it would be necessary to operate them at a high rate of speed. This would be sure to thresh the leaves and blossoms off the hay.



Drop gate lowered for starting the load



Drop gate raised for finishing the load

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Eq. (1) can be written as


$$f_{\alpha} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{1-\alpha} \right) \quad \text{and} \quad g_{\alpha} = \frac{1}{2} \left(\frac{1}{\alpha} - \frac{1}{1-\alpha} \right).$$

... Δ ...

[illegible]
$$y' = y^2 + 2y - 3 \quad y(0) = 1 \quad y(1) = 2$$

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